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RD 54
TASK 5
PHASE I
PROGRESS REPORT #5 - MODEL C

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6 JUNE 1956

OBJECTIVE:

To design and develop a miniature voice communicator and to construct two design approval models. After customer evaluation, four development models will be produced, incorporating changes that may be found desirable.

DATA:

1. Optical System.

a. Lenses.

A sufficient quantity of lenses for the design approval models was received on May 31. This was about 30 days later than the delivery date originally promised by the vendor and nearly two weeks later than the last date he promised. As a result, the assembly and testing of the optical parts was seriously delayed.

Preliminary tests of both the condenser system and the objectives have now been made. These tests indicate that the lens assemblies conform closely to the design calculations. Preliminary assembly of an optical plate can now be made to allow a test of a complete Model C unit.

b. Galvanometer.

The galvanometers were received from Midwestern Instruments on May 15. This was somewhat more than two weeks after their promised delivery date. Unfortunately, when Midwestern tested the galvanometer sensitivity they found it to be 40% lower than they had originally estimated. Their standard galvanometers, on which their estimates were based, have a lens system with an optical gain of 1.4 while the lens of the modified design has unity gain. This fact was overlooked when the sensitivity was estimated.

Midwestern is now experimenting with a modified suspension in an effort to increase the sensitivity. They believe they can produce a unit with the desired 12 mas/in. sensitivity and a coil resistance of about 34 ohms instead of 30 ohms. The resonant frequency would be perhaps 1550 cps instead of 1600 cps of the present units. The

slightly higher coil resistance would mean some reduction in power sensitivity from the original estimates but it would be satisfactory for use with the modulator amplifier.

The six galvanometers on hand will be kept, at present, and this type will be used in the design approval models. However, when Midwestern is in a position to provide higher sensitivity suspensions, the galvanometers can be returned to them for modification.

The use of the less sensitive units in the equipment will mean that only perhaps 80 to 90% modulation can be achieved instead of 100%. Galvanometers of the desired sensitivity would have allowed 100% modulation over most of the useful battery life.

One galvanometer has been placed on continuous life test and will be operated for about two weeks at full amplitude and 1500 cps.

2. Amplifiers.

The necessary experimental work to prevent coupling between transmitter and receiver has been completed. Copper shields of the shorted turn type as well as Mumetal shields are used on the receiver input transformer and the modulator output transformer. In addition a Mumetal shield is used over the major portions of the first two receiver stages.

3. Mechanical.

On the basis of the preliminary lens test results it was possible to proceed with fabrication of optical mounting parts for two design approval models. All the necessary mechanical parts for the two models are now being fabricated or are on order.

PROGRAM FOR NEXT INTERVAL:

It is expected that at least one design approval model will be completed by June 29. At this time it appears quite possible that both models will be completed.

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